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Turtles and ice: winter activity in non-native turtles in Romania

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Abstract

We present records of winter activity of non-native turtles, especially *Trachemys scripta*, the most common alien turtle in Romania. This species was observed basking in urban park lake settings in the winter months at the beginning of 2024. *Trachemys scripta* individuals were active during atypically warm days, but not during alternating cold spells with snowfall and ice formation; on warm days, turtles were also observed in the proximity of persisting lake ice. Other aquatic turtle species emerged from hibernation at the end of the winter, when temperatures were considerably higher, nearing 20 °C.

Key Words

alien species in Romania, *Graptemys pseudogeographica*, *Mauremys* sp., *Trachemys scripta*, winter activity in turtles

Numerous species of alien turtles are documented in Romania (Iftime and Iftime 2021). Of these, the most common is *Trachemys scripta* (Thunberg, 1792), the Pond Slider, a North American turtle that was introduced worldwide, mainly as discarded household pets (TTWG 2021; Uetz et al. 2023). In Romania, its presence in mainly urban waterbodies was widely documented (Sos 2007; Stănescu et al. 2017; Cioflec 2017–2021; Iftime and Iftime 2021), with significant morphological diversity suggesting multiple origins of introduction and intra- and interspecific hybridization (Iftime and Iftime 2022). Reproduction was documented in a few urban settings (Cioflec 2013; Matei and Tudor 2014; Iftime and Iftime 2021; Fănaru et al. 2024). Overwinter survival was considered an important limiting factor in the acclimatation of *T. scripta* in Europe (see discussion in Schradin 2020), though the species is naturally widespread in a temperate climate and is modelled to be able to live within vast areas of Europe, including neighbouring Bulgaria (Heidy Kikillus et al. 2010; Kornilev et al. 2020).

Here we report on the winter activity of *T. scripta* in lakes in two urban parks in Bucharest, Romania. The 2023–2024 winter was atypically mild, with mostly positive air temperatures and very low snowfall; however, this was interrupted by short cold spells with occasional snow showers during January 2024, negative temperatures (especially overnight), and ice formation/persistence occurring through early February.

In this context, we performed periodical visual observations of turtle activity in two parks in Bucharest—Morarilor Park (44.4398°N, 26.1705°E) and Circului/State Circus Park (44.4576°N, 26.1127°E). The former hosts a lake of ca. 8000 m^2 in area, bordered by concrete embankments but enclosing some reed bed areas. The latter is a slightly smaller lake (ca. 7000 m^2 in area), initially 4 m deep but by 2024 much shallower, with earth banks, reed beds, and Indian lotus vegetation. Both lakes were observed to harbour both native and alien turtle species, alongside native waterbirds and opportunistic fish species, both native and alien. We performed visual transects

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during selected warmer days in January and February. One day was allocated to one park/lake, as we expected activity to be concentrated during maximum insolation at mid-day. We also performed control observations on cold spell days, e.g., on the 20th of January, with snowfall and thin ice cover, when no turtle was observed. The air temperature was measured using a Dwyer WT-10 digital thermometer. The readings were also corroborated with those provided by nearby weather stations.

We observed activity and basking/swimming behaviour of *T. scripta* during the warmer, sunny days, occurring even between the harshest cold spells of January. In the Morarilor Park lake, *T. scripta* individuals (both *T. s. scripta*, *T. s. elegans*, and hybrids/intergrades thereof; see discussion in Iftime and Iftime 2022, for subspecific identification) were found active on the 5th, 19th, and 26th of January and the 3rd, 8th, and 24th of February, while in the Circului Park lake the same species was active on the 4th, 7th, and 23rd of February (Table 1). During most of these days, turtle activity (basking, swimming) took place despite the partial ice cover present (Figs 1, 2). Some turtles were active even near the ice edge (Figs 3, 4). Most individuals were quite large adults, and likely the same few (5–6) individuals were seen active through the coldest part of the winter. We noted behaviour patterns that aid in retaining heat, such as group basking, basking on wood, and heat-conserving postures (Figs 5, 6), while other basking sites were readily available (mostly at reedbed edges) and predators were absent. No other turtle species, native or alien, were observed except during the last days of February (23rd and 24th) when the weather was noticeably milder and there was no more ice.Then, we observed other species active alongside *Trachemys*—the native European Pond Turtle, *Emys orbicularis* (Linnaeus, 1758), and alien turtles: False Map Turtle *Graptemys pseudogeographica* (Gray, 1831) and a possible hybrid/introgressive *Mauremys* (*sinensis* (Gray, 1834) × *reevesi* (Gray, 1831), Chinese Striped-necked × Reeves' Turtle, Fig. 7; see Lee et al. 2019).

Figure 1. Habitat in Morarilor Park, 26.01.2024, photo O. Iftime.

Figure 2. Habitat in Circului Park, 04.02.2024, photo O. Iftime.

Our observations revealed a different winter activity pattern for the observed species, with sporadic emergence between cold spells exhibited only by *T. scripta*, whereas the other turtle species, both native and non-native, emerged only when the weather became consistently warmer at the end of the cold season.

Table 1. Winter observations of turtles in two park lakes in Bucharest, Romania.

Site	Date (2024)	Observation hours, weather conditions	Individuals observed
Lake in Morarilor Park	05.01	14.00–15.30 h, ca. 15–16 °C, weak W wind, sunny, no ice	*Trachemys scripta*, 11 ex., basking and swimming
	19.01	14.45–15.30 h, ca. 12 °C, cloudy, variable wind, ca. 60–70% of lake covered by thin ice	*Trachemys scripta*, 4 ex., swimming
	26.01	14.45–15.15 h, ca. 6–7 °C, cloudy, weak cold wind, ca. 85% of lake covered by thin ice	*Trachemys scripta*, 3 ex., swimming
	03.02	13.00–15.15 h, 8–9 °C, cold N wind, sunny, ca. 10–20% of lake covered by thin ice	*Trachemys scripta*, 13 ex., basking and swimming
	08.02	14.00–16.00 h, 17 °C, sunny, weak N wind, no ice	*Trachemys scripta*, 30 ex., basking and swimming
	24.02	13.00–15.30 h, 20 °C, mostly sunny, no ice	*Trachemys scripta*, 52 ex., basking and swimming; *Emys orbicularis*, 5 ex., basking; *Graptemys pseudogeographica*, 1 ex., basking
Lake in Circului Park	04.02	13.00–15.00 h, 12 °C, cold wind, sunny, ca. 30% of lake covered by ice	*Trachemys scripta*, 6 ex., basking and swimming
	07.02	12.50–15.45 h, 15–18 °C, cold WSW wind, mostly sunny, no ice	*Trachemys scripta*, 17 ex., basking and swimming
	23.02	14.00–16.00 h, 16–18 °C, sunny, weak wind, no ice	*Trachemys scripta*, 60–70 ex., basking and swimming; *Mauremys sinensis* × *reevesii*, 1 ex., basking; *Graptemys pseudogeographica*, 1 ex., basking

Figure 3. *Trachemys scripta* swimming at the ice edge, Morarilor Park, 26.01.2024, photo O. Iftime.

Figure 5. Group basking in *Trachemys scripta*, Morarilor Park, 08.02.2024, photo O. Iftime.

Figure 4. *Trachemys scripta* swimming near ice edge, Circului Park, 04.02.2024, photo A. Iftime.

Figure 6. Heat-conserving posture when basking on wood in *Trachemys scripta*, Morarilor Park, 08.02.2024, photo O. Iftime.

Figure 7. Possible introgressive *Mauremys*, Circului Park, 23.02.2024, photo O. Iftime.

Trachemys scripta is capable of prolonged anoxic overwintering (ca. 45 days at 3–5 °C; Stecyk et al. 2007). However, it is sensitive to freezing temperatures (especially as nest-wintering hatchlings) (Baker et al. 2010), and deviations from optimal overwintering temperatures can have a negative impact on the health and survival of *T. scripta* (Máté 2015). Also, prolonged cold spells/harsher winters can induce mass mortality in *T. scripta* adults. Examples include cases reported by Stoyanov (2015) from Bulgaria, where the species is likewise alien. We observed a similar incident in March 2012 at the Botanical Garden of Bucharest, where at least a dozen *T. scripta* died due to deep and prolonged freezing of their aquatic habitat, while we recorded no dead individuals of *E. orbicularis*, a species also present there. As both temperature and photoperiod influence its metabolic activity (Reyes and Milsom

2010), *T. scripta* can emerge and be active in the winter in its native range, where activity during warmer winter days, even along or under ice, was observed (Ernst et al. 1994). *Trachemys scripta* was sometimes observed to reduce or completely skip hibernation in the mild climate of its non-native range in southern Spain (Pérez-Santiagosa et al. 2013). Our records establish that *T. scripta* is also capable of sporadic winter activity in Romania, i.e., in a non-native range and a temperate climate, when subject to unseasonably warm weather and in an urban setting. It has been postulated that such overwinter activity gives *T. scripta* an advantageous „early start" in an alleged competition with other (including native) turtle species for basking spots (Pérez-Santiagosa et al. 2013). However, our observations suggest otherwise, as *E. orbicularis* and *G. pseudogeographica* take advantage of the larger, pre-warmed *T. scripta* by climbing and basking on top of them, though alternative basking spots are quite plentiful (Figs 8, 9), adding to the observations by Kleewein (2015). Winter activity (and associated behaviour patterns) in *T. scripta* may rather be indicative of different ecological characteristics, which would in fact minimize interspecies competition (cf. Kleewein 2015), a hypothesis that remains to be clarified by more detailed investigation.

Figure 8. *Emys orbicularis* basking on top of group basking *Trachemys scripta*, Morarilor Park, 24.02.2024, photo O. Iftime.

Figure 9. *Graptemys pseudogeographica* basking on top of *Trachemys scripta*, Circului Park, 23.02.2024, photo O. Iftime.

Despite the unseasonably warm winter, other alien turtles and the native *E. orbicularis* did not start activity until the very end of the winter period (end of February), when temperatures increased and there was no ice, suggesting opportunistic winter activity is absent or much rarer in such species.

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